

Identifying the potential impacts on Hanumante River, Bhaktapur and its mitigation measures

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INTRODUCTION

Bhaktapur District, a part of Bagmati Zone, is one of the 75 districts of Nepal. The ancient city is also known as Nepal's "Cultural Capital" and is a UNESCO World Heritage site. It is one of the most organized towns in Nepal. It is located in approximately 15 km east of the Katmandu Valley and is located on top of a small hill, which rises from the northern banks of the Hanumante River. It is densely built with narrow lanes, row houses surrounding small courtyards, and many temples and shrines.

The city is also surrounded by agricultural fields. This agricultural field has been the main income generation of the district. Waste generated by the residents in Bhaktapur district is either composted by them, or put out in the streets for collection by the municipality or sold to waste buyers. Some people, however, still dump their waste on the banks of the Hanumante River or other public places. Blooming urbanization and different industrial activities are also playing important role in the deterioration of the river quality.

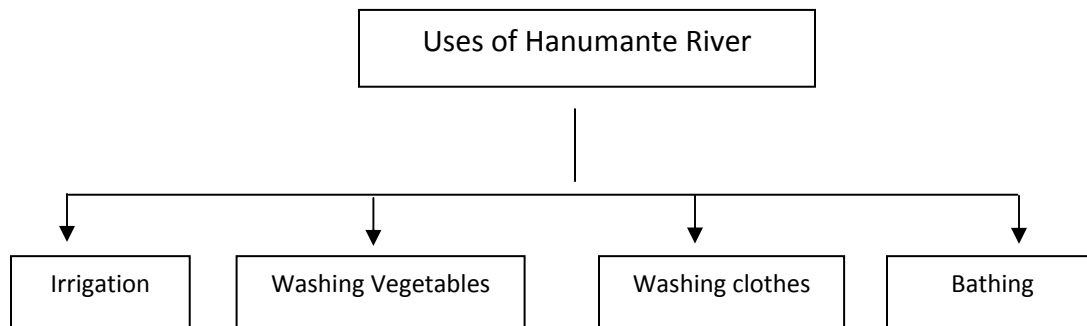
OBJECTIVES

- To determine the possible impacts caused due to the river and industries to the environment and the household areas.
- To recommend the mitigation measures for the possible impacts.
- To determine the different sources for causing the pollution in the river.
- To know different responses from the respondents regarding the pollution of the river.

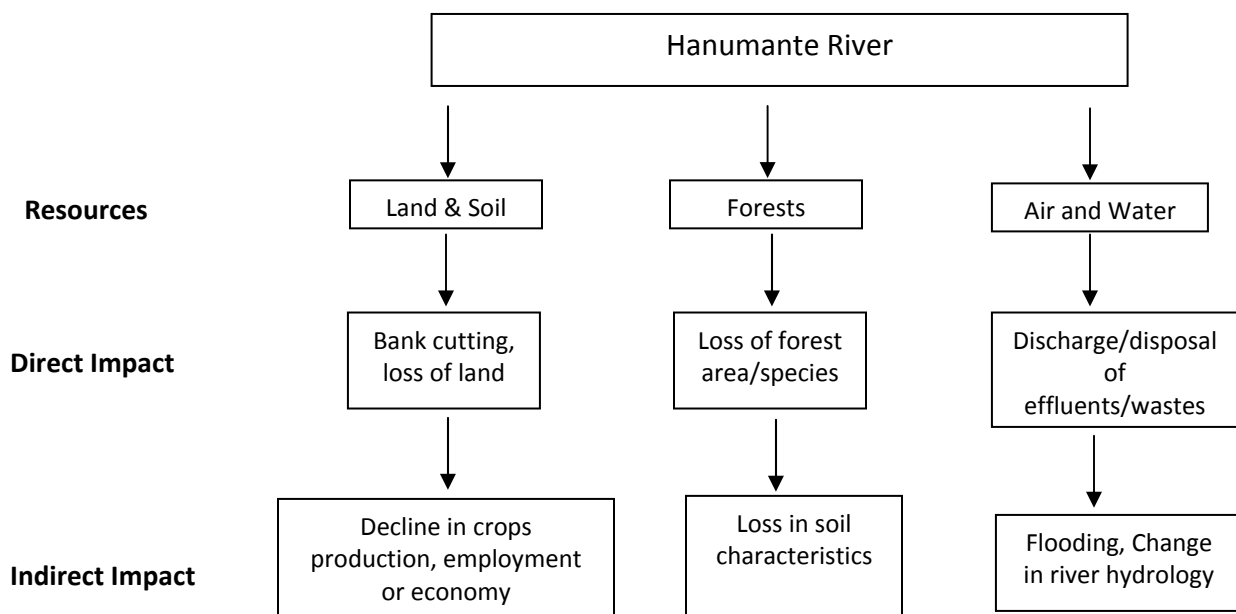
SITE SELECTION

The site selected for the study was taken from the stretch extending from Jagati to Madhyapur Thimi. The site was selected for the various reasons. Firstly, the site was mainly influenced by the industrial areas and includes many big cities like Sallaghari, Suryabinayak, Jagati and Madhyapur Thimi. Secondly, these cities have also many religious and cultural perspectives, and these properties were affected due to the pollution in the river. In addition to this, the human encroachment has been increased highly so that all the waste generated from different sites has been dumped directly to the river.

SCHEMATIC REPRESENTATION OF USE AND IMPACTS AT HANUMANTE RIVER



Utilization of Hanumante river for different purposes



Schematic diagram on possible impacts of Hanumante river on the environment

POTENTIAL IMPACTS AND MITIGATION MEASURES

The Hanumante River has been a place for ritual bathing, irrigation and as well for other usage for many centuries. But in recent years, it has been a sink for the urban waste, which is depleting its value. Because of urbanization and industrial activities, the quality of the river has been also highly deteriorated. This will pose direct and indirect impact on the different religious and cultural properties, agricultural crops and the human health.

IMPACTS

- The quality of the river was highly deteriorated due to chemical discharges from the industry and dumping of the different household wastes including organic and inorganic wastes.
- Frequent use of river water for the agriculture had also affected in the production of the agricultural crop as compared to previous years. Decline in the crop production had also resulted in the loss of economy.
- The use of water from the river had also caused indirect impact on the human health.
- From the survey, it can be said that in previous years the people used to depend on the river water for drinking facilities, but now the river has been so badly deteriorated that the water not even suited for domestic purpose.
- Due to the pollution in the river, the aesthetic value of the site is highly affected including the religious and the cultural properties, by which the district is well known.
- According to the survey, highest impact was found on a portion of river in Araniko Highway. This part consist of more industries comprising of bleaching and garment industry, paint industry, wood processing industry, and chemical industry.

MITIGATION MEASURES

1. Consideration of Alternatives: Alternatives should be taken by the farmers for the basis of irrigation to improve the production of the agricultural crops. On the field visit, the water of Ghatte Khola was clean and in good health than Hanumante. So the alternatives like proper irrigation channel should be constructed from Ghatte Khola to irrigate the agricultural field.

2. Corrective Measures: Treatment technologies should be undertaken by the industries in discharging the harmful wastes directly to the river. Besides this, regular monitoring of the river should be done for the improvement of its quality.

3. Compensatory Measures: Since the farmers directly depend upon the river water for their agricultural field, the polluter i.e. industry should give some compensation to them.

4. Preventive Measures: Public awareness program and health education program should be initiated to reduce the potential adverse impacts before occurrence.

OUTCOMES OF THE SURVEY

From the survey done to different respondents around Hanumante River, it can be concluded that there are various reasons for changing the water quality like industry effluents, dumping of wastes and domestic sewage. Mainly the industries discharge their wastes directly to the river thereby deteriorating its health and quality. Most of the people

depend on the river water for agricultural purpose, and few of them use the well water for washing vegetables. In most of the cases, due to degraded river water, most of the people had to suffer the loss in the agricultural production. Most of the people had responded for avoiding dumping wastes and stopping industrial discharges as the preventive measures for the protection of the river.

From the survey, it can also be concluded that most of the people have willingness to conserve and protect the river.

CONCLUSION

Most of the people in Bhaktapur District depend upon the agricultural field. The district is also famous for religious and cultural perspectives, which has been a main source for generating income in the district. According to the survey, the main impact was observed on the agricultural land as well as the quality of the river.

The change in river quality has made fluctuations in living standard of the people, so Hanumante River, being culturally and socially important, should be conserved by adopting proper precautionary measures.

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ANNEX



Photo.1 Hanumante Khola at the Araniko Highway crossing near Thimi (upstream the bridge)



Photo.2 Industrial discharge on the Hanumante Khola at the Araniko Highway crossing near Thimi



Photo.3 Water abstraction for agriculture purpose from Hanumante Khola between Sallaghari and Thimi



Photo 4 Dumping of municipal domestic wastes into Hanumante Khola between Sallaghari and Thimi, Madhyapur Municipality



Photo.5 Hanumante Khola at the Araniko Highway crossing near Thimi (downstream the bridge)



Photo.6 Religious and Cultural importance of Hanumante Khola near Dept. of Music in Bhaktapur



Photo.7 Local people depending upon the water of Hanumante Khola in Hanuman Ghat, Jagati



Photo.8 Industrial discharge (Garment factory) on Hanumante Khola near Thimi



Photo.9 Direct disposal of domestic sewage into Hanumante Khola between Sallaghari and Thimi



Photo.10 Vegetable washing at the confluence of Ghatte Khola and Hanumante



Photo.11 Indigenous conservation practice to prevent river bank cutting in Hanumante Khola between Sallaghari and Thimi



Photo.12 Agricultural crops around Hanumante Khola between Sallaghari and Thimi